

WHAT IS CLAIMED IS:

1. A discrete or single-dose detergent formulation comprising a hydrophobically modified polymer comprising:

a) a hydrophilic backbone prepared from at least one monomer

5 selected from the group consisting of:

1) an ethylenically unsaturated hydrophilic monomer selected from the group consisting of unsaturated C₁-C₆ acid, amide, ether, alcohol, aldehyde, anhydride, ketone and ester;

10 2) polymerizable hydrophilic cyclic monomer;

3) non-ethylenically unsaturated polymerizable hydrophilic monomer which is selected from the group consisting of glycerol and other polyhydric alcohols;

4) and combinations thereof,

15 wherein said hydrophilic backbone is optionally substituted with one or more amino, amine, amide, sulfonate, sulfate, phosphonate, phosphate, hydroxy, carboxyl or oxide groups; and

b) at least one hydrophobic moiety prepared from at least one hydrophobic monomer, chain transfer agent, or surfactant; said

20 hydrophobic monomer is selected from the group consisting of a siloxane, saturated or unsaturated alkyl and alkoxy group, aryl and aryl-alkyl group, unsaturated C₈-C₁₈ alkyl, unsaturated C₈-C₁₈ alkyl with alcohol/amine or carboxylic functionality, alkyl sulfonate, aryl sulfonate, and combinations thereof; said chain transfer

25 agent has 1 to 24 carbon atoms and is selected from the group consisting of a mercaptan, amine, alcohol, alpha olefin sulphonate, and combinations thereof; and said surfactant is an

alcohol ethoxylate or an alkyl phenol ethoxylate or alkyl benzene sulfonate,

wherein said formulation is formed into pre-measured single dose portions.

2. The detergent formulation of claim 1 wherein said formulation comprises
5 from 0.001 to 50 weight percent, based on the total weight of formulation, of said hydrophobically modified polymer.
3. The detergent formulation of claim 1 wherein said formulation is in the form of either a tablet or a sachet.
4. The detergent formulation of claim 1 further comprising at least one
10 surfactant and/or a builder.
5. The detergent formulation of claim 1 wherein said formulation comprises a laundry detergent.
6. The detergent formulation of claim 1 wherein said formulation comprises an auto-dishwashing detergent.
- 15 7. The detergent formulation of claim 1 wherein the ethylenically unsaturated hydrophilic monomer is selected from the group consisting of acrylic acid, methacrylic acid, ethacrylic acid, alpha-chloro-acrylic acid, alpha-cyano acrylic acid, beta methyl-acrylic acid (crotonic acid), alpha-phenyl acrylic acid, beta-acryloxy propionic acid, sorbic acid, alpha-chloro sorbic acid,
20 angelic acid, cinnamic acid, p-chloro cinnamic acid, beta-styryl acrylic acid (1-carboxy-4-phenyl butadiene-1,3), itaconic acid, maleic acid, citraconic acid, mesaconic acid, glutaconic acid, aconitic acid, fumaric acid, tricarboxy ethylene, 2-acryloxypropionic acid, 2-acrylamido-2-methyl propane sulfonic acid, vinyl sulfonic acid, vinyl phosphonic acid, sodium methallyl
25 sulfonate, sulfonated styrene, allyloxybenzenesulfonic acid, dimethylacrylamide, dimethylaminopropylmethacrylate, diethylaminopropylmethacrylate, vinyl formamide, vinyl acetamide,

polyethylene glycol esters of acrylic acid and methacrylic acid and itaconic acid, vinyl pyrrolidone, vinyl imidazole, maleic acid, maleic anhydride, and combinations thereof.

- 5 8. The detergent formulation of claim 1 wherein the hydrophobic monomer is selected from the group consisting of styrene, α -methyl styrene, 2-ethylhexyl acrylate, 2-hydroxyethyl acrylate, octylacrylate, lauryl acrylate, stearyl acrylate, behenyl acrylate, 2-ethylhexyl methacrylate, octylmethacrylate, lauryl methacrylate, stearyl methacrylate, behenyl methacrylate, 2-ethylhexyl acrylamide, octylacrylamide, lauryl acrylamide, 10 stearyl acrylamide, behenyl acrylamide, propyl acrylate, butyl acrylate, pentyl acrylate, hexyl acrylate, 1-vinyl naphthalene, 2-vinyl naphthalene, 3-methyl styrene, 4-propyl styrene, t-butyl styrene, 4-cyclohexyl styrene, 4-dodecyl styrene, 2-ethyl-4-benzyl styrene, 4-(phenylbutyl) styrene, and combinations thereof.
- 15 9. The detergent formulation of claim 1 wherein the chain transfer agent has from 3 to 18 carbon atoms.
10. A formulation comprising a non-aqueous solution comprising a hydrophobically modified copolymer comprising:
- 20 a) a hydrophilic backbone prepared from at least one monomer selected from the group consisting of:
- 1) an ethylenically unsaturated hydrophilic monomer selected from the group consisting of unsaturated C_1 - C_6 acid, amide, ether, alcohol, aldehyde, anhydride, ketone and ester;
- 25 2) polymerizable hydrophilic cyclic monomer;

- 3) non-ethylenically unsaturated polymerizable hydrophilic monomer which is selected from the group consisting of glycerol and other polyhydric alcohols;
- 4) and combinations thereof,

5 wherein said hydrophilic backbone is optionally substituted with one or more amino, amine, amide, sulfonate, sulfate, phosphonate, phosphate, hydroxy, carboxyl or oxide groups; and

b) at least one hydrophobic moiety prepared from at least one hydrophobic monomer, chain transfer agent, or surfactant; said hydrophobic monomer is selected from the group consisting of a siloxane, saturated or unsaturated alkyl and alkoxygroup, aryl and aryl-alkyl group, alkyl sulfonate, aryl sulfonate, unsaturated C₈-C₁₈ alkyl, unsaturated C₈-C₁₈ alkyl and alcohol/amine or carboxylic functionality, and combinations thereof; said chain transfer agent has 1 to 24 carbon atoms and is selected from the group consisting of a mercaptan, amine, alcohol, alpha olefin sulphonate, and combinations thereof; and said surfactant is an alcohol ethoxylate or an alkyl phenol ethoxylate or alkyl benzene sulfonate.

20 11. The formulation of claim 10, further comprising ethylene glycol, polyethylene glycol or propylene glycol.

12. A method for treating aluminum comprising contacting at least one surface of an aluminum object with a formulation comprising a hydrophobically modified copolymer comprising:

25 a) a hydrophilic backbone prepared from at least one monomer selected from the group consisting of:

- 1) an ethylenically unsaturated hydrophilic monomer selected from the group consisting of unsaturated C₁-C₆ acid, amide, ether, alcohol, aldehyde, anhydride, ketone and ester;
- 5 2) polymerizable hydrophilic cyclic monomer;
- 3) non-ethylenically unsaturated polymerizable hydrophilic monomer which is selected from the group consisting of glycerol and other polyhydric alcohols;
- 4) and combinations thereof,
- 10 wherein said hydrophilic backbone is optionally substituted with one or more amino, amine, amide, sulfonate, sulfate, phosphonate, phosphate, hydroxy, carboxyl or oxide groups;
- b) at least one hydrophobic moiety prepared from at least one hydrophobic monomer, chain transfer agent, or surfactant; said
- 15 hydrophobic monomer is selected from the group consisting of a siloxane, saturated or unsaturated alkyl and alkoxy group, aryl and aryl-alkyl group, alkyl sulfonate, aryl sulfonate, and combinations thereof; said chain transfer agent has 1 to 24 carbon atoms and is selected from the group consisting of a
- 20 mercaptan, amine, alcohol, alpha olefin sulphonate, and combinations thereof; and said surfactant is an alcohol ethoxylate or an alkyl phenol ethoxylate or alkyl benzene sulfonate,
13. The method of claim 12 wherein said treatment comprises de-icing.
14. The method of claim 12 wherein said treatment comprises cleaning.
- 25 15. The method of claim 12 wherein said solution comprises a metal-working fluid.

16. A rinse aid composition comprising a hydrophobically modified polymer comprising:

a) a hydrophilic backbone prepared from at least one monomer selected from the group consisting of:

- 5 1) an ethylenically unsaturated hydrophilic monomer selected from the group consisting of unsaturated C₁-C₆ acid, amide, ether, alcohol, aldehyde, anhydride, ketone and ester;
- 2) polymerizable hydrophilic cyclic monomer;
- 10 3) non-ethylenically unsaturated polymerizable hydrophilic monomer which is selected from the group consisting of glycerol and other polyhydric alcohols;
- 4) and combinations thereof,

wherein said hydrophilic backbone is optionally substituted with one
15 or more amino, amine, amide, sulfonate, sulfate, phosphonate, phosphate, hydroxy, carboxyl or oxide groups; and

b) at least one hydrophobic moiety prepared from at least one hydrophobic monomer, chain transfer agent, or surfactant; said hydrophobic monomer is selected from the group consisting of a
20 siloxane, saturated or unsaturated alkyl and alkoxy group, aryl and aryl-alkyl group, unsaturated C₈-C₁₈ alkyl, unsaturated C₈-C₁₈ alkyl with alcohol/amine or carboxylic functionality, alkyl sulfonate, aryl sulfonate, and combinations thereof; said chain transfer agent has 1 to 24 carbon atoms and is selected from the group
25 consisting of a mercaptan, amine, alcohol, alpha olefin sulphonate, and combinations thereof; and said surfactant is an

alcohol ethoxylate or an alkyl phenol ethoxylate or alkyl benzene sulfonate,

wherein said composition is used as a rinse aid in the rinse cycle of an automatic dishwasher.

- 5 17. The composition of claim 16 wherein said composition further comprises at least one non-ionic surfactant.

10047957 011502